

General Specifications

GS 12D06A03-01E

EXA ISC

Model ISC202G 2-wire Inductive Conductivity Transmitter

■ General

The EXA ISC202 transmitter is a user programmable instrument for conductivity measurements in medium to highly conductive process liquids, using inductive measuring principles. It is used in combination with the Yokogawa model ISC40 inductive conductivity sensor, for concentration monitoring applications in the chemical industry and for various other conductivity applications in the food and pharmaceutical industry, the plating and metal finishing industry and pulp & paper industry. The robust chromated cast aluminium housing, makes it the ideal 2-wire transmitter for mounting directly on-site, even under tough environmental conditions.

Its 2-wire concept gives low installation costs, a safe operation and easy maintenance in the field. HART® communication is also available.

The ISC202 features user-selectable process dedicated temperature compensation for various (strong) acids and alkalis.

The process linearised output function and the "%"-concentration displays contribute to a highly functional inductive conductivity based concentration analyzer.



■ Features

- Process optimised temperature compensation on fit the instrument in any application.
- Extremely wide measuring range (> 6 decades) while maintaining a high resolution and accuracy using only one sensor type : 0 to 1999 mS/cm.
- Free programmable setting of the output range, including a 21-step table output to linearise the output function e.g. to % by weight.
- Programmable % by weight display indication.
- Proven simple 3-level operation system using YES/NO prompts where each level can separately be protected from unwanted access by a 3-digit passcode.
- Passive 2-wire system, 4 to 20 mA for easy installation at low costs and safe operation at 24 V DC.
- HART®, PROFIBUS-PA, FOUNDATION Fieldbus H1 communications

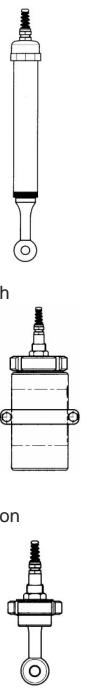
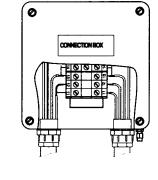
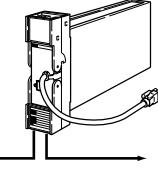
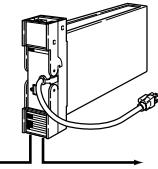
■ Applications

- Applications where severe electrode fouling prevents the use of contacting electrodes.
- All ranges except the (ultra) pure water applications.
- Chemical processes except concentrated sulfuric, nitric, and fluoric acids.
- Slurry applications where conventional systems suffer from plugging or erosion.
- Applications where the 6-decimal rangeability is necessary for accurate process control.

■ System configuration

Refer to applicable GS for inductive conductivity sensor, fitting, terminal box, and extension cable.

Non-explosionproof System

Inductive Conductivity Sensor	Holders	Inductive Conductivity Transmitter	Distributor
<ul style="list-style-type: none"> Non-explosionproof type  <p>ISC40G ISC40GJ</p>	<ul style="list-style-type: none"> Immersion ISC40FD ISC40FDJ Flow-Through ISC40FF ISC40FFJ Direct Insertion ISC40FS ISC40FSJ 	<ul style="list-style-type: none"> Non-explosionproof type Inductive Conductivity Transmitter ISC202G  <p>Terminal Box</p> <ul style="list-style-type: none"> Terminal Box BA10, BA20  <ul style="list-style-type: none"> Extension Cable WF10, WF10J 	<ul style="list-style-type: none"> Dedicated Distributor for EXA PH SC ISC PH201G*B  <ul style="list-style-type: none"> Output 1 to 5 V DC Hold contact output Failure contact output <ul style="list-style-type: none"> General Purpose Type Distributor SDBT, SDBS  <ul style="list-style-type: none"> Output 1 to 5 V DC

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■ Measurement principle

Unlike -2 or 4- electrode conductivity systems, the ISC202 analyzes conductivity without any contact between the electrodes and process fluid. The measurement is based on the inductive coupling of 2 ring transformers (Toroids) by the liquid.

The ISC202 supplies a reference voltage (V_1) at a high frequency to the "drive coil." The core of this coil is of a highly permeable magnetic material, and a strong magnetic field is generated in the toroid.

The liquid passes through the hole in the toroid and can be considered as a "one turn" secondary winding.

The magnetic field induces a voltage (V_2) in this liquid winding. The induced current thus made to flow is proportional to this voltage and the conductance of the liquid's "one turn winding" is according to Ohm's law.

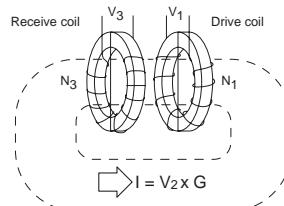
The conductance ($G = 1/R$) is proportional to the specific conductivity and a constant factor that is determined by the geometry of the sensor (the length divided by surface area of the hole in the toroid) and the installation of the sensor.

There are 2 toroids mounted in the doughnut-shaped sensor. The liquid also flows through the second toroid and therefore the liquid turn can be considered as the primary winding of the second ring transformer. The current in the liquid will create a magnetic field in the second toroid.

The induced voltage (V_3) being the result of this magnetic field can be measured as the output. The output voltage of this "receive coil" is, therefore, proportional to the specific conductivity of the process liquid.

There are 2 toroids mounted in the doughnut-shaped sensor.

Inductive conductivity measurement principle



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■ Process dedicated temperature compensation

The ISC202 features optimisation of the temperature compensation for virtually any process. From neutral salt solutions to the most concentrated acids and alkalis. From tight controlled and/or very stable processes to processes that have extreme variations in both conductivity and temperature. The ISC202's temperature compensation can easily be adapted to meet the accuracy requirements for temperature compensation imposed by the process control targets.

Temperature compensation based on the IEC 60746-3 table for NaCl solution can be selected for standard conductivity measurements in different processes.

For measurements requiring accuracy such as concentration applications, the temperature compensation can be tailored to the process. This is done during

commissioning of the transmitter by using the actual process solution by programming a (linear) temperature coefficient : "α" (see Figure 1). For processes where the temperature coefficient varies with temperature and concentration (eg Sodiumhydroxide and Sulphuric acid), matrix compensation is applied.

To further simplify transmitter set up, the matrices for several common process solutions are stored in memory. Any of these can be selected from the Service Menu of the transmitter. These include:

Sulphuric Acid	H_2SO_4	0.5 - 5.0 %,	0 - 100 °C
Sulphuric Acid	H_2SO_4	2.5 - 25.0 %,	0 - 100 °C
Hydrochloric Acid	HCl	0.5 - 5.0 %,	0 - 60 °C
Hydrochloric Acid	HCl	1.0 - 20.0 %,	0 - 60 °C
Nitric Acid	HNO_3	0.5 - 5.0 %,	0 - 80 °C
Nitric Acid	HNO_3	2.5 - 25.0 %,	0 - 80 °C
Sodium Hydroxide	NaOH	0.5 - 5.0 %,	0 - 100 °C
Sodium Hydroxide	NaOH	0.5 - 15.0 %,	0 - 100 °C

If your process is not covered by one of these selectable curves, the user can create curves specific to the process. This is done by building a simple matrix table of temperature related conductivity values. Thus the accuracy of the measurement is fine-tuned to the specific process conditions.

The matrix compensation method guarantees optimal accuracy where TC dependence from conductivity and process temperature is taken into account.

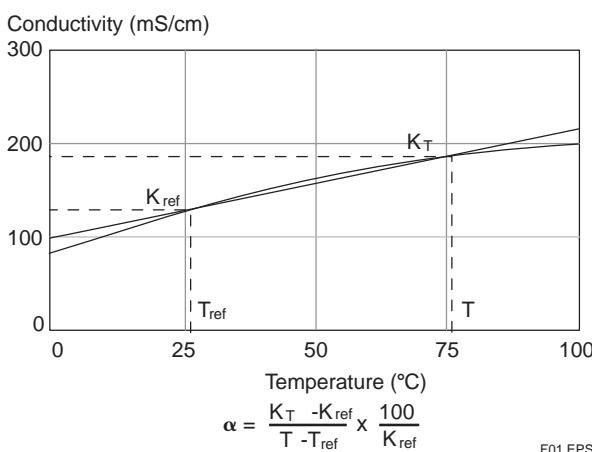


Figure 1 Definition of temperature compensation factor (α)

■ Output signal

The standard ISC202 features a 4-20 mA current output available for recording, indication or control functions which represent:

- the measured conductivity value

In addition the following output functions are available:

- a "HOLD" function that holds the last measured process value or a fixed value during maintenance or commissioning
- a "BURN" function that gives a high, low or pulsed output at fail status
- a programmable output function that allows the user to linearise the output when used as a concentration analyzer.

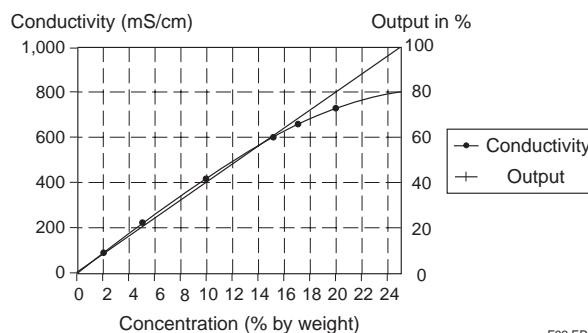


Figure 2 Linearization of output (Example: 0-25% Sulfuric acid)

Table 1 where Conductivity is converted to concentration (Example: 0-25% Sulfuric acid)

Code	mA	Conc.	Example	Cond.	Example
Output	4-20	% H_2SO_4	mS/cm		
0	4.0	0.00	0		
5	4.8	1.25	60		
10	5.6	2.50	113		
15	6.4	3.75	180		
20	7.2	5.00	211		
25	8.0	6.25	290		
30	8.8	7.50	335		
35	9.6	8.75	383		
40	10.4	10.00	424		
45	11.2	11.25	466		
50	12.0	12.50	515		
55	12.8	13.75	555		
60	13.6	15.00	590		
65	14.4	16.25	625		
70	15.2	17.50	655		
75	16.0	18.75	685		
80	16.8	20.00	718		
85	17.6	21.25	735		
90	18.4	22.50	755		
95	19.2	23.75	775		
100	20.0	25.00	791		

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■ Fault diagnosis - burnout function

The measurement is continuously checked for faults, giving warning of abnormal conductivity readings and cable problems. These faults are signaled by the FAIL flag and can be transmitted to the control room by a current of 21 mA, or 3.6 mA (burn). This is also available in HART communication. The fault is also signaled by a special marker field in the display, and an error code in the message display.

■ Cell constant (Installation Factor)

The ISC40 sensor is a doughnut-shaped sensor. When installing the sensor, be sure to allow the process fluid to flow through the doughnut hole and around the sensor freely.

The sensor is provided with a gasket and retaining nut. This allows "bulkhead mounting" in a tank wall or standard flange through a hole with a 27-mm diameter (A). The insertion depth is 124 mm. Using a 20-mm size wrench, the sensor can be easily mounted and aligned.

The WF10(J) Extension Cable may be used with the BA10, BA20 Terminal Box. The total length of the extension cable and the sensor cable should not exceed 50 m.

The installation factor of the ISC40 is the ratio of the measured conductivity at the sensor and the specific conductivity of the solution. The unit is cm^{-1} just as the cell constant of a contact electrode system. An installation factor unique to each sensor is indicated on the label of the sensor cable. (The nominal value is 1.88 cm^{-1} .) This

factor varies depending on materials of process piping and the distance between the doughnut sensor and process piping. If the distance is less than 30 mm, sensor calibration is required before using the ISC40. From the calibration results, the ISC202 will calculate an installation factor corresponding to the installation conditions and use it for conductivity measurement.

In case where sensor calibration is difficult to be conducted, enter the manually calculated installation factor into the ISC202 following the instructions below.

-When a sensor is installed in the standard stainless steel holder, ISC40FF-S, ISC40FFJ-S:

An installation factor decreases approximately 7%. Reduce the value indicated on the label of the sensor cable by 7%, and then enter the result.

-When a sensor is installed in the standard polypropylene holder, ISC40FF-P, ISC40FFJ-P:

An installation factor increases approximately 1%. Increase the value indicated on the label of the sensor cable by 1%, and then enter the result.

-When a sensor is installed in long piping with a distance (D) between the sensor and piping, as shown in Figure 3:

The installation factor for pipe mounting (reference data when the nominal value is 1.88 cm^{-1}) is shown in Figure 3. Divide the value indicated on the label of the sensor cable by 1.88 and then multiply the quotient by the value obtained from Figure 3. Enter the result.

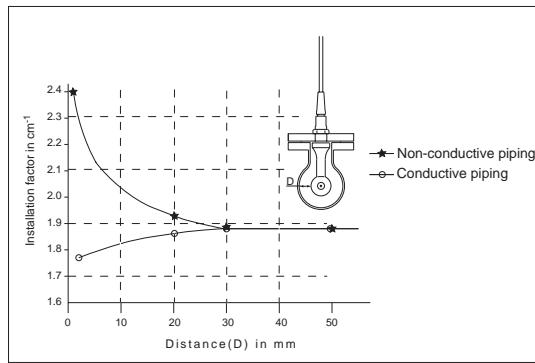
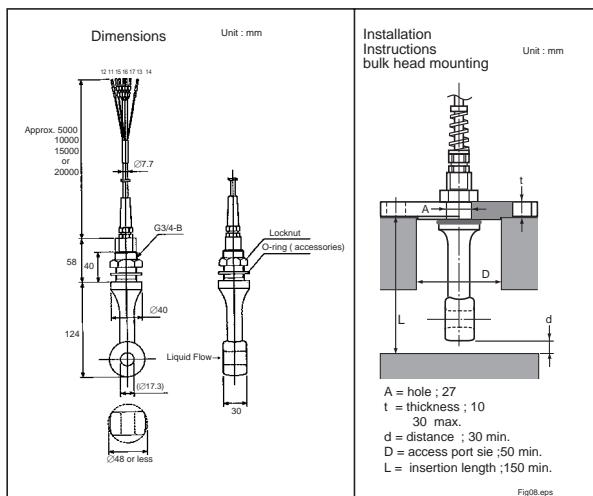


Figure 3 Installation Factor (Reference) for Pipe Mounting



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With this 3-level user-friendly approach, the instrument can be operated by anyone.

All three levels can be separately protected against unauthorised access by a password system using a three digit code.

■ HART Communication

One of the features of smart field devices is their ability to detect faults, either in the device electronics or in an associated sensor. Using a fieldbus system, such faults are reported in the device status byte in every message (assuming that communication is still possible!). For HART, it is still useful to follow the convention of indicating fault conditions by setting the analogue output current to a value which is recognisably beyond the normal operating range (including the small amount of linear over-range commonly allowed). If it is still alive, the current output value is set to an appropriate value with the intention that a host system should be able to set alarm thresholds just outside the normal 4 to 20 mA range, to indicate measurement out-of-range, and to set further alarm thresholds to indicate a fault condition.

DD specification and other support files

The ISC202 Device Description (DD) files are available enabling communications compatible HOST devices (and HHT for HART). Other files to support AMS, PRM and PDM are available as well.

(Note) Do not submerge the sensor itself in process water, as the seams between the mold and the metal of the sensor are not waterproof.

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■ General specifications

1. TRANSMITTER

Input specifications	Compatible with the Yokogawa inductive conductivity ISC40 series with integrated temperature sensor: Pt1000 or 30kΩ NTC.
Input ranges	
- Conductivity	: 0 to 1999 mS/cm at 25 °C (77 °F) reference temperature.
- Temperature	: -20 to 140 °C (4 to 284 °F).
- Cable length	: max. 60 meters total length of fixed sensor cable + WF10(J) extension cable. Influence of cable can be adjusted by doing an AIR CAL with the cable connected to a dry cell. Terminal box and extension cable can not be used with ISC202SJ.
Functional specification	
Accuracy (under reference conditions): (Output span is 0 - 100 μS/cm or more)	
- Conductivity	: $\pm (0.4 \%FS + 0.3 \mu\text{S}/\text{cm})$
Linearity	: $\pm (0.4 \%FS + 0.3 \mu\text{S}/\text{cm})$
Repeatability	: $\pm (0.4 \%FS + 0.3 \mu\text{S}/\text{cm})$
- Temperature	: $\pm 0.3^\circ\text{C}$
Note on accuracy specifications:	The following tolerance is added to above performance. mA output tolerance : $\pm 0.02 \text{ mA}$ of "4 - 20 mA"
- Step response	: $\leq 8 \text{ seconds}$ for 90 % (for 2 decade step).
Indicating range	
Main display	: 0 to 1999 mS/cm (1st compensation)
Message display	: 0 to 1999 mS/cm (2nd compensation), Temperature -20 to 140 °C (0 to 280 °F) Concentration 0 to 100.0 % Temperature compensation methods NaCl, T.C., Matrix Cell constant [cm ⁻¹] Reference Temperature (°C/F) Software Release.
Transmission signal	
Output signal	: Isolated output of 4-20 mA DC. Burn up (21 mA) or Burn down (3.6 mA when HART or distributor comm. is non-used, 3.9 mA when HART or distributor comm. is used) or pulse of 21 mA to signal failure.
Hold	: Outputs may be set to hold the last or a fixed value during maintenance.
Transmission range	
Conductivity	: Minimum span: 100 μS/cm Maximum span: 1999 mS/cm Setting value at 4 mA output: $\leq 90\%$ of setting value at 20 mA output

Maximum load resistance :

For the ISC202G, see figure 5.
200 Ω or less with the PH201G
50 Ω or less with the SDBT

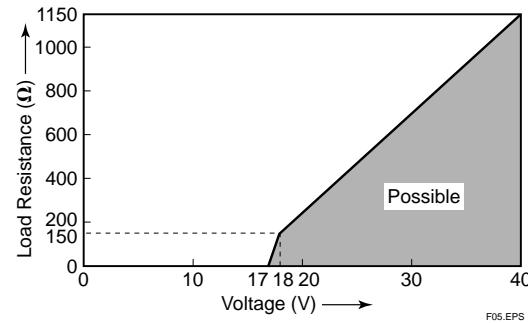


Figure 5 Supply voltage/ load diagram (ISC202G)

Environment and operational conditions

Ambient temp.	: -10 to +55 °C (10 to 130 °F)
Storage temp.	: -30 to +70 °C (-20 to 160 °F)
Relative humidity	: 10 to 90% RH at 40°C ambient temperature, non condensing

Temperature compensation

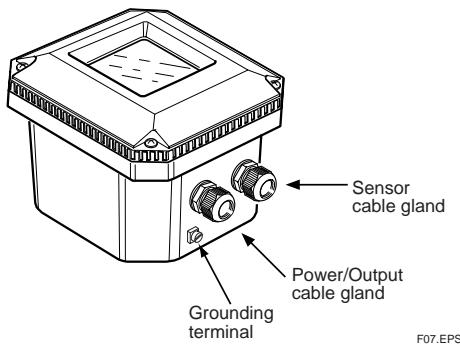
Sensor types	: Pt1000 or 30kΩ NTC.
Automatic	: -20 to 140 °C (0 to 280 °F)
Algorithm	: selectable as mentioned below NaCl according to IEC 60746-3 tables. Two T.C. setting possible between 0.00 to 3.50 %/°C Matrix: user selectable/ configurable. 8 selectable for concentrated solutions, 1 free programable. Reference temperature adjustable between -20 to 140 °C (0 to 280 °F)
Sensor diagnostics	: Abnormal temperature, abnormal conductivity values, e.g. dry cell, wiring problems.
Calibration	: Manual, calibration Input pre-measured data (cell constant).

Weather resistant	: IP65, NEMA 4X, Type 3S
Mounting	: Pipe, Wall or Panel.
Dimensions	: Refer to the appropriate external dimensions.
Weight	: approx. 1.6 kg Mounting brackets weight approx. 0.7 kg
Logbook	: Software record of important events and diagnostic data.

Construction

Display	: Custom liquid crystal display
- Main display	: 3 1/2 digits, 12.5 mm high, zero change included.
- Message display	: 6 alphanumeric characters, 7 mm high.
- Special fields	: Flags for status indication : FAIL and HOLD.
- Measuring units	: μS/cm or mS/cm
- Key prompts	: YES, NO, >, ^, ENT, Menu pointer

- Keys	: 6 keys operated through flexible window with tactile feedback. One hidden key behind the front cover.
Power supply	: Normal 24 V DC loop powered system, see Figure 5, 6, 7. ISC202G: 17 - 40 V DC
Input Isolation	: Maximum 1000 V DC
Housing	:
- Material	: Cast aluminium case with chemically resistant coating, cover with flexible polycarbonate window.
- Color	: Case : Off-white (Equivalent to Munsell 2.5Y8.4/1.2) Cover : Deepsea Moss green (Equivalent to Munsell 0.6GY3.1/2.0)
- Cable gland	: 2-Pg13.5

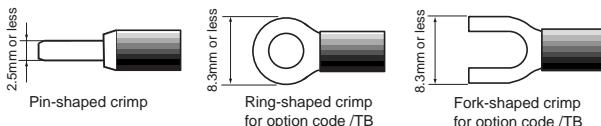


Automatic safeguard: Return to measuring mode after 10 minutes when no keystroke.

Operation protection : 3 digital pass codes (programmable).

Data protection: EEPROM for configuration.

Cable and terminals: The glands will form a tight seal on cables with an outside diameter in the range of 6 to 12 mm. For terminal end, see figure.



Requirement of connecting with external instruments

	Terminal for pin cable terminal	Screw terminal (option /TB)
Crimp contact for cable	Pin-shaped crimp contact with sleeve insulator	Ring-shaped or fork-shaped crimp contact
Usable contact	max. 2.5 mm	Crimp contact shown as the figures under this table, which meets M3 screw
Torque for fixing	0.5 N·m or less	1.35 N·m (recommended)
Example of crimp contact*	Weidmuller Co., Ltd. made: H0.34/10, H0.5/12, H1/12, H1.5/12S	JST, Mfg. Co., Ltd. made: VD1.25-3(Ring shape), VD1.25-S3A(Fork shape)

*Note: Other crimp contact may be required, depending on core-cable diameter.

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EMC Conformity standards (ISC202G)  

EN 61326-1 Class A, Table 2 (For use in industrial locations)

EN 61326-2-3

EN 61326-2-5 (Profibus communication may be influenced by strong electromagnetic field.)

Korea Electromagnetic Conformity Standard

HART® communications

Input	: Two-wire system, 4-20 mA DC
Power supply	: ISC202G : up to 40 volts
Note:	The transmitter contains a switched power supply, drawing its energy from the 0-4 mA section of the signal. Consequently the 17 volt limit is applied at 4 mA. The characteristic of the unit is such that above about 7 mA on the output, the terminal voltage can drop to 14.5 volts without problem.
Transmission Signal	: Isolated output of 4 to 20 mA DC.
	: Maximum load 425Ω at 24 VDC
	Burn to signal failure acc.
	NAMUR Recommendation NE43 (18.01.1994)

Operating range Communication : 3.9 to 21 mA

: HART®, 1200 Baud, FSK modulated on 4 to 20 mA signal

Configuration Software : Local with 6 keys

: Firmware based on Yokogawa stack.

Hardware : Yokogawa HART Modem F9197UB

Other Control systems : Yokogawa PRM, Rosemount AMS, Siemens PDM

Hand Terminal : Rosemount HHT 275/375

Output span :

-Conductivity : min 100 µS/cm, max. 1999 mS/cm. (max 90% zero suppression)

Cable specification : 0.5 mm diameter or 24 AWG over maximum length of 1500 m

DD specification : The ISC202 Device Description is available enabling communications with the Handheld communicator and compatible devices.

PROFIBUS-PA communications

Input signal: Digital

Supply voltage: 9 to 32 V DC

Operating current: 26.0 mA

Operating values: According to IEC 1158-2

Bus connection: Fieldbus interface based on IEC 1158-2 according to FISCO-Model

Power supply: Power supply is achieved dependant on the application by means of segment coupler

Data transfer: According to PROFIBUS- PA profile class B based on EN 50170 and DIN 19245 part 4

GSD file: The actual file can be downloaded from www.profibus.com

Configuration: Local with 6 keys

Software: Firmware based on Siemens DPC31 stack.

Hardware: PC- or PCMCIA-interfaces from Siemens

Other control: Siemens PDM systems

Electrical connection: Terminals acc. to IEC 1158-2

Fieldbus-cable-types: Twisted and shielded two wire cable according to recommendation based on IEC 1158-2

Cable diameter: 6 to 12 mm (0.24 to 0.47 inch)

FOUNDATION Fieldbus H1 communications

Input signal: Digital

Supply voltage: 9 to 32 V DC

Operating current: 26.0 mA (base current)

Operating values: According to IEC 1158-2

Bus connection: Fieldbus interface based on IEC 1158-2 according to FISCO-Model

Power supply: Power supply is achieved dependant on the application by means of segment coupler

Data transfer: FF Specification Rev. 1.4, Basic device

Function blocks: 3xAI, Transducer, Resource

Files: Actual file can be downloaded from our homepage

Configuration: Local with 6 keys,

Software: National Instruments, NI-FBUS configurator

Hardware: FBUS-interfaces from National Instruments (AT-FBUS and PCMCIA FBUS)

Other control systems: Yokogawa PRM, DMT

2. DISTRIBUTOR: PH201G (Style B)

The PH201G supplies drive power to 2-wire transmitter. The PH201G receives a 4-20 mA DC current signal from the transmitter, and converts the signal to a 1-5 V DC voltage signal. Simultaneously, it also receives a digital signal superimposed on the 4-20 mA DC current signal, and provides as outputs a hold-contact signal and a fail-contact signal. In addition, the PH201G has a built-in current regulator so that it will not supply an excess current even if the circuit or the power supply cable on the transmitter shorts.

<Input/Output Signal Specifications>

Number of input points

(Number of transmitter units connectable)

: 1 point

Output signal : 1 to 5 V DC (2 points)

Load resistance : 2k Ω or less (1 to 5 V DC Output)

Isolation system : Loop isolation type

Between input and output is not isolated

Between input/output and power supply is Isolated

<Mounting / Form>

Mounting method : Indoor rack mounting

Connection method : External signal connection

: M4 screw terminal connection

Power supply / Ground connection :

100V : JIS C8303 ground type 2 plug connection or M4 screw terminal connection (option:/TB)

220V : CEE 7VII (European electrical device standard) plug connection

Cable length : 300 mm

External dimensions

: 180H x 48W x 300D mm

Weight : Approx. 1.7 kg (Including rack and case)

<Standard Specifications>

Accuracy : $\pm 0.2\%$ of span

Transmitter supply voltage :

: 26.5 \pm 1.5 V DC

Maximum current and power consumption

24V DC : Approx. 4.8 W

100V AC : Approx. 7 VA

220V AC : Approx. 11VA

Insulation resistance

Between I/O terminals and ground pin

: 100 M Ω / 500 V DC

Between power supply pins and ground pin

: 100 M Ω / 500 V DC

<Operating Specifications>

Ambient temperature

: 0 to 50 °C

Ambient humidity : 5 to 90% RH (Non-condensing)

Power supply : Dual use AC/DC

100V : DC power 20 to 130 V, no polarity AC power 80 to 138 V, 47 to 63 Hz

220V : DC power 120 to 340 V, no polarity AC power 138 to 264 V, 47 to 63 Hz

<Contact Output>

Contact rating : 250 V AC, maximum 100 VA

220 V DC, maximum 50 W

Hold contact output : N.C. 1 contact, Normally energized

Contact closes when power is off or during maintenance.

Failure contact output

: N.C. 1 contact, Normally energized

Contact closes when power is off or during failure.

■ Model and suffix codes

1. 2-wire Inductive conductivity transmitter (Non-explosionproof type)

[Style: S2]

Model	Suffix Code	Option Code	Description
ISC202G	.....	.....	2-wire Inductive conductivity transmitter
Type	-A	.....	mA with HART
	-P	.....	Profibus
	-F	.....	FF
Language	-J	.....	Japanese
	-E	.....	English
Option	Mounting Hardware	/U	Pipe, wall mounting bracket (Stainless steel)
		/PM	Panel Mounting bracket(Stainless steel)
	Hood	/H	Hood for sun protection (Carbon steel)
		/H2	Hood for sun protection (Stainless steel)
	Tag Plate	/SCT	Stainless steel tag plate
		/AFTG	G1/2
	Conduit Adapter	/ANSI	1/2NPT
		/TB	Screw terminal (*1)
		/X1	Epoxy baked finish (*2)

(*1) It can be specified when the suffix code -A is selected.

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(*2) The housing is coated with epoxy resin.

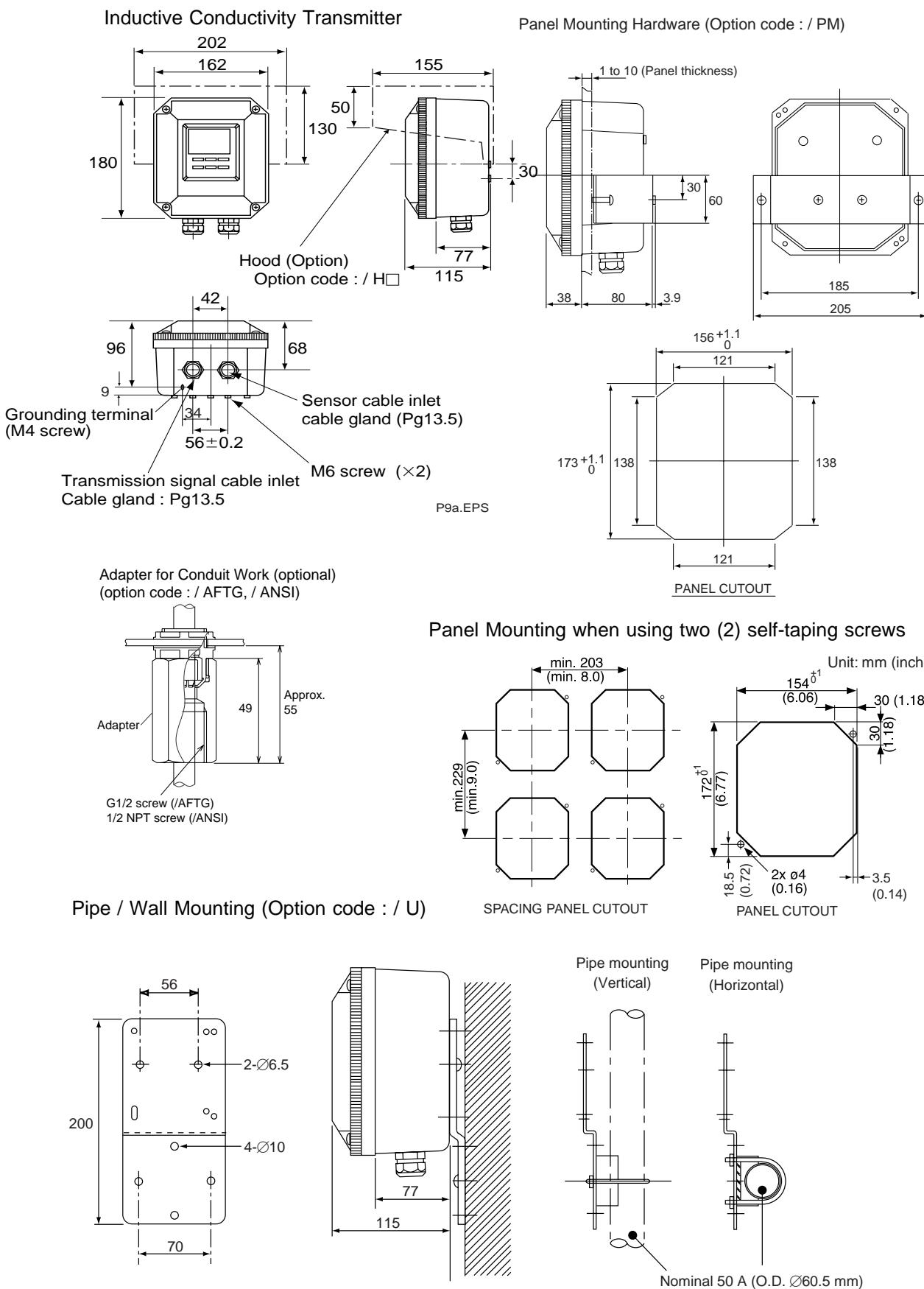
2. Dedicated distributor

Model	Suffix Code	Option Code	Description
PH201G	.....	.....	Distributor
Power Supply	-A1	100V AC
	-A2	220V AC
—	*B	Style B
Option		/TB	Terminal for Power connection

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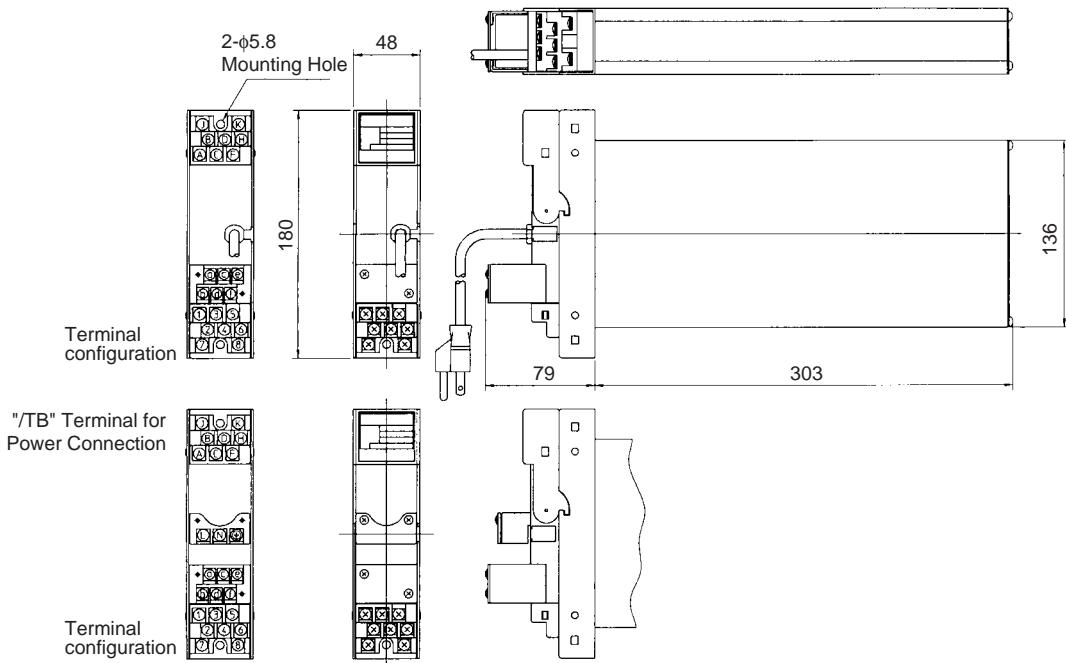
■ Dimensions

Unit : mm



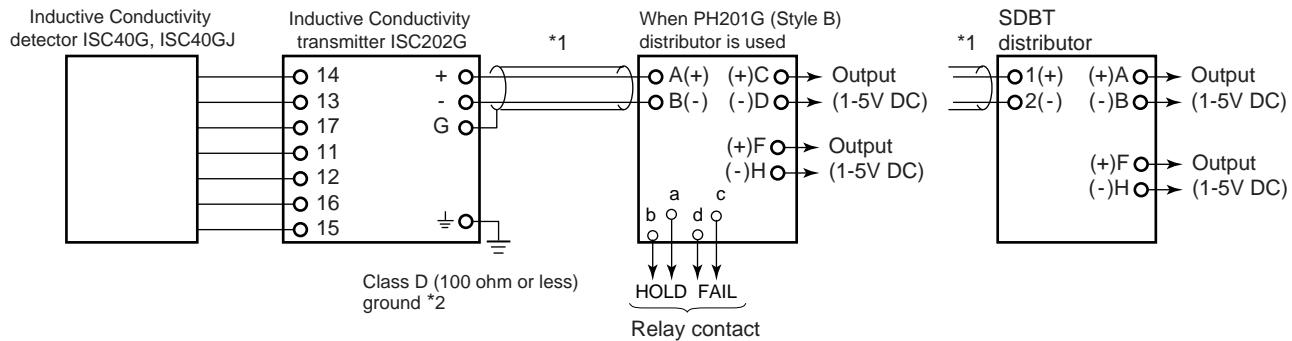
PH201G Distributor (Style B)

Unit : mm



■ External wiring

Non-explosionproof System



*1 Use two-wire cable with OD (Outside Diameter) of 6 to 12 mm

Make sure distributor voltage does not drop below minimum for ISC202G

*2 Ground ISC202G (Class D ground: 100 ohm or less)

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Inquiry Specifications for 2-wire Inductive Conductivity Transmitter System

Make inquiries by filling in related boxes with checks (✓) and writing in the underlined parts.

1. General Items

Name of your company: _____
 Person in charge: _____ Belongs to: _____ (Phone No. _____)
 Name of plant: _____
 Measuring point: _____
 Purpose of use: Indication Record Alarm Control
 Power supply to Distributor: _____ V AC

2. Measuring Conditions

(1) Liquid temperature: _____ to _____, Normal [°C]
 (2) Liquid pressure: _____ to _____, Normal [kPa]
 (3) Flow rate: _____ to _____, Normal [l / min.]
 (4) Flow speed: _____ to _____, Normal [m / s]
 (5) Slurry or fouling components: No Yes
 (6) Name of measuring liquid: _____
 (7) Components of measuring liquid: _____
 (8) Others: _____

3. Installing Location

(1) Ambient temperature: _____
 (2) Installing location: Outdoors Indoors _____
 (3) Others: _____

4. Specification Requirements

(1) Measuring range: _____
 (2) Transmission output: 4 to 20mA DC HART® PROFIBUS-PA FOUNDATION Fieldbus H1
 (3) Type of transmission output: Linear Non-linear
 (4) System configuration selection: Sensor Holder Transmitter Terminal box Extension cable
 (5) Sensor mounting: Immersion Flow-through Direct insertion
 (6) Sensor cable length: _____ m
 (7) Extension cable length: _____ m
 (8) Others: _____